IN THE CLAIMS:

1. (currently amended) A system for ultrasonic bonding comprising:

an ultrasonic horn in contact with a material to be bonded; and

non-contact means for measuring an amplitude of said ultrasonic horn;

said non-contact means including a light source transmitting a high intensity light beam onto a material contacting surface of said ultrasonic horn.

2. (currently amended) A system ~~in accordance with Claim 1~~ for ultrasonic bonding comprising:

an ultrasonic horn in contact with a material to be bonded; and

non-contact means for measuring an amplitude of said ultrasonic horn; and

wherein said ultrasonic horn is a rotating ultrasonic horn.

3. (currently amended) A system in accordance with Claim 2, wherein said non-contact means comprises a light source disposed perpendicular to an axis of rotation of said ~~rotary~~ rotating ultrasonic horn, said light source transmitting a high intensity light beam onto a material contacting surface of said rotating ultrasonic horn, at least one lens positioned to receive a portion of a plurality of reflected light beams reflected off said material contacting surface and to project said portion of said plurality of reflected light beam as a light spot, at least one detector positioned to detect each said light spot, said at least one detector producing a detector output signal proportional to a strength and a location of each said light spot on said detector,

integrated signal conditioning means for conditioning said detector output signal and translation means for converting a light spot displacement on said at least one detector into a horn displacement.

4. (original) A system in accordance with Claim 3, wherein said non-contact means comprises two said detectors aligned such that a line drawn between corresponding points of said detectors is parallel to said axis of rotation of said rotating ultrasonic horn.

5. (currently amended) A system in accordance with Claim 2, wherein said non-contact means comprises:

optical fibers including a light emitting optical fiber disposed perpendicular to an axis of rotation of said ~~rotary~~ rotating ultrasonic horn, said light emitting optical fiber transmitting a light beam onto a material contacting surface of said rotating ultrasonic horn;

the optical fibers further including a light receiving optical fiber optically ~~conected~~ connected to a photodetector and positioned to receive a portion of reflected light reflected off said material contacting surface and transmit the reflected light to the photodetector;

the photodetector producing a detector output signal proportional to an intensity of said light on said detector;

integrated signal conditioning means for conditioning said detector output signal; and

translation means for converting a conditioned detector output signal into a horn displacement.

6. (original) A system in accordance with Claim 5, wherein said non-contact means comprises two or more of the emitter or the detector optical fibers.

7. (original) A system in accordance with Claim 3, wherein said translation means comprises a data acquisition system adapted to receive said output signal from said integrated signal conditioning means and correlate said displacement to said amplitude of said rotating ultrasonic horn.

8. (original) A system in accordance with Claim 5, wherein said translation means comprises a data acquisition system adapted to receive said output signal from said integrated signal conditioning means and correlate said displacement to said amplitude of said rotating ultrasonic horn.

9. (original) A system in accordance with Claim 1 further comprising control means for directly regulating said amplitude of said ultrasonic horn operably connected to said ultrasonic horn.

10. (original) A system in accordance with Claim 2, wherein said light source is a laser.

11. (original) A system in accordance with Claim 2, wherein said light source is an LED.

12. (currently amended) A system for directly controlling an amplitude of an ultrasonic horn comprising:

an ultrasonic horn;

non-contact measurement means for directly measuring an amplitude of said ultrasonic horn; and

control means for modulating said amplitude of said ultrasonic horn in communication with said non-contact measurement means;

wherein said non-contact measurement means comprises a non-contact amplitude sensor and a data acquisition and analysis system, said data acquisition and analysis system operatively connected to said amplitude sensor and determining an amplitude of said ultrasonic horn; and

wherein said ultrasonic horn is a rotating ultrasonic horn.

13. (canceled) ~~A system in accordance with Claim 12, wherein said non-contact measurement means comprises a non-contact amplitude sensor and a data acquisition and analysis system, said data acquisition and analysis system operatively connected to said amplitude sensor and determining an amplitude of said ultrasonic horn.~~

14. (canceled) ~~A system in accordance with Claim 13, wherein said ultrasonic horn is a rotating ultrasonic horn.~~

15. (currently amended) A system in accordance with Claim ~~13~~ 12, wherein said non-contact amplitude sensor comprises:

a light source for directing a beam of light onto a surface of an ultrasonic horn, thereby generating reflected light;

a photodetector for receiving said reflected light, said detector producing an output signal proportional to at least one of an intensity of said light and a location of said light on said detector;

translating means for correlating said output signal to the amplitude of the ultrasonic horn; and

means for adjusting the amplitude of said horn in accordance with said correlated signal.

16. (original) A system in accordance with Claim 15, wherein said non-contact means comprises two said detectors aligned such that a line drawn between corresponding points of said detectors is parallel to said axis of rotation of said rotating ultrasonic horn.

17. (currently amended) A system in accordance with Claim 15, wherein said data acquisition and analysis system further comprises translation means for converting a displacement of said light ~~spot~~ beam on said detector into a horn displacement.

18. (currently amended) A system in accordance with Claim 15, wherein said non-contact means comprises:

optical fibers including a light emitting optical fiber disposed perpendicular to an axis of rotation of said ~~rotary~~ rotating ultrasonic horn, said light

emitting optical fiber transmitting a light beam onto a material contacting surface of said rotating ultrasonic horn;

the optical fibers further including a light receiving optical fiber optically connected to a photodetector and positioned to receive a portion of reflected light reflected off said material contacting surface and transmit the reflected light to the photodetector; and

the photodetector producing a detector output signal proportional to an intensity of said light on said detector.

19. (original) A system in accordance with Claim 18, wherein said non-contact means comprises two said detectors aligned such that a line drawn between corresponding points of said detectors is parallel to said axis of rotation of said rotating ultrasonic horn.

20. (original) A system in accordance with Claim ~~13~~12, wherein said non-contact amplitude sensor comprises a non-contact displacement measuring device employing the eddy current principle.

21. (original) A system in accordance with Claim ~~13~~12, wherein said non-contact amplitude sensor comprises a non-contact inductive displacement measuring device.

22. (original) A system in accordance with Claim ~~13~~12, wherein said non-contact amplitude sensor comprises a non-contact capacitive displacement measuring device.

23. (new) A system for directly controlling an amplitude of an ultrasonic horn comprising:

an ultrasonic horn;

non-contact measurement means for directly measuring an amplitude of said ultrasonic horn; and

control means for modulating said amplitude of said ultrasonic horn in communication with said non-contact measurement means;

wherein said non-contact measurement means comprises a light source for directing a beam of light onto a surface of an ultrasonic horn which contacts a material to be bonded, thereby generating reflected light; and

a photodetector for receiving said reflected light.